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ABSTRACT

A computer-assisted instruction (CAI) program using Utah PILOT programming language was constructed that includes the same objectives that are taught during the presentation of a traditional library tour. The amount of time necessary to complete the CAI program is approximately the same time needed by a student taking a library tour. The population for the study consisted of ENG 1020 classes at Central Missouri State University. Department of English and Philosophy instructors volunteered the use of their classes for this study. The classes were divided into three groups consisting of a computer-assisted instruction group (N=66), a tour group (N=64), and a control group (N=40). Each group was given a pretest, subjected to the teaching method, and then administered a posttest. This measured the amount of difference in learning that took place between the two tests. Each test also served another purpose. The pretest was utilized to collect such student demographic data as student status, previous involvement in library work, knowledge of library skills, size of high school graduation class, and previous use of or skills with computers. The posttest was used to gather information on the students' opinions and evaluation of the particular treatment to which they were exposed. There was little difference in the over-all rating given the treatment method by either of the experimental groups. The majority in both groups indicated that they felt the teaching method in which they had participated was average or above. Since the CAI group showed the highest adjusted posttest mean, and their evaluation of the program was equal to or better than that of the general library tour, it was concluded that the CAI treatment proved to be more effective in teaching basic library orientation and research skills. (3 references) (BBM)

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STUDENTS' PREFERENCE FOR BIBLIOGRAPHIC INSTRUCTION: LIBRARY TOUR VS. A COMPUTER-ASSISTED INSTRUCTION PROGRAM

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ABSTRACT

The researcher constructed a computer-assisted instruction (CAI) program using Utah PILOT programming language. The CAI program includes the same objectives that are taught during the presentation of a traditional library tour. The amount of time necessary to complete the CAI program is approximately the same time needed by a student taking a library tour.

The population used for this study consisted of ENG 1020 classes at Central Missouri State University. Department of English and Philosophy instructors volunteered the use of their classes for this study. The classes were divided into three groups consisting of a computer-assisted instruction group, a tour group and a control group. Each group was given a pre-test, subjected to the teaching method and then administered a post-test. This measured the amount of difference in learning which took place between the two tests.

Each test also served another purpose. The pre-test was utilized to collect such student demographic data as current student status, previous involvement in library work, knowledge of library skills, size of high school graduation class, and previous use or skills with computers. The post-test was used to gather information on the students' opinions and evaluation of the particular treatment -- computer-assisted instruction or library tour -- to which they were exposed.

Introduction

This study is an evaluative one which compares the teaching methodologies used with three groups of students enrolled in ENG 1020 Rhetorical Writing at Central Missouri State University. Central Missouri State University is a state-supported university located in Warrensburg, Missouri and has a student population of approximately ten thousand. ENG 1020 is a general studies class offered by the Department of English and Philosophy that requires its students to utilize library materials in order to write several papers during the semester. In order for students to become better acquainted with the facilities of Ward Edwards Library and the basic skills needed to conduct general research, most classes are brought to the library and given a one-hour orientation/instruction tour.

The Fall semester was chosen as the best time to conduct this study because most students in the ENG 1020 classes are generally first-term freshmen right out of high school. This would ensure less contamination due to prior use of the library and the research sources found there.

The hypothesis to be tested is: There is no significant difference in the attitudes and opinions about the method of instruction between students taking the ENG 1020 tour and the students assigned to use the computer-assisted instruction program.

Computer-Assisted Instruction Program

The professional librarians in Ward Edwards Library

are asked to provide tours for many ENG 1020 classes. The Department of English and Philosophy provides objectives to be covered on these tours. These objectives entail general library orientation, and introduction and instruction in the use of basic research tools such as the card catalog, information located on a catalog card, Library of Congress Guide to Subject Headings, periodical indexes (with major emphasis on the Readers' Guide), and newspaper indexes (emphasizing the New York Times Index).

The success of this study depended upon the production of a computer-assisted instruction tutorial program that would teach the objectives that the Department of English and Philosophy request be presented during a ENG 1020 library tour in approximately the same amount of time. Fitzgerald, Arnott and Richards (1986) in their article, "Computer-Assisted Instruction in Libraries: Guidelines for Effective Lesson Design," write that there are certain factors that should be considered in the planning, development and implementation of computer assisted instruction lessons. They conclude that the use of CAI is well-suited to teaching library basics and that its use will free time normally taken for this task. It is further stated in the article that CAI can be a powerful aid to librarians but at the present time the use of it has been virtually un-tapped. One point made in the article that should be addressed is the inference that programming and librarians do not go together. The authors suggest that the programming should be left to a programmer,

but do not state that librarians be the programmers.

The researcher, having conducted ENG 1020 tours for eight years, designed a computer-assisted instruction program entitled "Libraries and the Search for Knowledge: A Computer Program" using version 7.0 of Utah PILOT (Programmed, Inquiry, Learning Or Teaching). The make-up of the program followed the typical instructional-design procedures (Crandall, 1987, p.xv) and included

1. An intended audience to use the program.
2. Identification of the objectives to be covered.
3. Organization of instruction into specific sequences.
4. Development of program content.
5. Procedure to determine the effectiveness of the program in covering the objectives.

PILOT is a unique programming language which allows the user to interact with the computer during the course of the program (Starkweather, 1985). Although PILOT is limited with regard to graphic capabilities, it was chosen because it can be mastered by people (librarians) who do not have a strong computer programming background. In essence, a person who uses PILOT to construct a CAI program should be a specialist in a particular subject, rather than a computer programmer. If the experiment proves successful, the duplication of such a program using PILOT is feasible and can be adapted by other librarians for use at any academic institution.

The ENG 1020 computer-assisted instruction program was

constructed in thirteen separate modules. To begin the program the user places the disk in the computer drive and turns on the machine. The program is equipped with an autoexec.bat file that automatically takes the user to the beginning of the program. Once underway, the student must complete the program in a single session.

Population

The population of this study is freshmen students enrolled in ENG 1020 Rhetorical Writing. Each Fall Central Missouri State University enrolls between two and three thousand new freshmen students. One required core-course for all undergraduates is the ENG 1020 class offered by the Department of English and Philosophy. There are generally forty-five or fifty sections of the course offered during the Fall semester, with approximately thirty students in each class. During the Fall Semester in which this study took place, approximately one thousand five hundred sixty students were enrolled in ENG 1020 classes. Ninety to ninety-five percent of these were incoming Freshmen.

Incoming freshmen at Central Missouri State University enroll through the Office of Counseling Services. The procedure for selection of classes is as follows: students are randomly assigned a counselor who meets with them and informs them of the general core requirements; students are then asked to choose the specific classes that they plan to take for their first semester (ENG 1020 is normally taken during the first academic school year); the counselor inputs

that information into the computer terminal, which is connected to the university mainframe computer, and a list of the courses is generated on a form. Except for problems due to job interference or class conflicts, students do not choose the meeting time, nor a specific instructor. Therefore, the students are randomly assigned to a specific class without regard to personal preference and the make-up of each class is indiscriminate.

The researcher solicited the permission of the Chair of the Department of English and Philosophy and those individual instructors assigned to teach the various class sections in order to carry out the experimental study. After permission of all those involved had been obtained, the instructors who had volunteered the use of their classes were randomly chosen to participate either as one of the two experimental groups or as the control group. The instructors of eight ENG 1020 classes volunteered their classes for use in the study. Two sections (forty students) were selected for the control group and six sections (one hundred thirty-two students) were selected for the experimental groups. In order to prevent any contamination because of the meeting time of the classes, the two classes scheduled in the morning were randomly assigned to be either a control group or one of the experimental groups. The remainder of the classes were randomly assigned to the control group or one of the experimental groups unless the instructor stated differently.

One of the experimental groups (three sections) was

assigned to take the traditional library tours that are normally conducted for the ENG 1020 classes. The tour guides for these experimental groups taking the traditional library tour were selected randomly from among the professional library staff of Ward Edwards Library. The procedure was for the individual ENG 1020 instructor to call the Associate Director's office to schedule a tour. At that time a professional staff member was then scheduled to be the tour guide. Because the Associate Director had been informed of the study, the researcher was not scheduled to be one of the tour guides. This insured that the proposed objectives were covered by the guide without bias and that a "Hawthorne" effect would not materialize. All students were required to sign an attendance sheet after the tour to substantiate their attendance.

The other experimental group, consisting of three classes, was assigned to complete the computer-assisted instruction program. Ten copies of the program were placed in the "Self-Instruction Center" located on the ground floor of Ward Edwards Library. Therefore, the programs were available for student use during the time that the library was open, approximately ninety-five hours per week. The time given to the students to complete the CAI program occurred during the same time that the tours were being conducted for the other experimental group. To ensure that all students using the computer-assisted instruction program completed their assignment, each student was required to return to

their respective instructors the "Certificate" generated at the end of the program.

The control group (two class sections) was not given any indication that an experiment was being conducted, but they were encouraged by their instructors to become more familiar with the lay-out of the library and the basic general reference tools needed to conduct research.

Data Collection

Pre-tests and Post-tests

The instrument used to collect the data for this evaluative study was a pre-test and a post-test given to each student who participated in either of the experimental groups or the control group. The researcher prepared the pre- and post-tests based upon his past experience in conducting ENG 1020 tours. All teaching objectives required for the tour were incorporated into these tests. The pre-test and the post-test were evaluated and tested by members of the professional staff of Ward Edwards Library and by ENG 1020 instructors to determine their validity.

The pre- and post-tests addressed those objectives covered during the ENG 1020 tour or the ENG 1020 computer-assisted instruction program. Although the same material was covered on each test, the pre-test was not an exact duplication of the post-test in that the questions on each test were not given the same numbers. This ensured that students could not associate one numbered

question with another. Also, both the experimental groups and the control groups were administered the same pre-test and the same post-test. This ensured that the effect of the pre-test and the post-test was similar across groups, with no varying degrees of difficulty.

The same pre-test was administered to each class involved in the experimental study. Each of the three groups was provided with a "bubble" answer sheet and each group had a different code in the special code section of the answer sheet. For example, the CAI experimental group had 01 as their code number, the tour experimental group was given a code of 02, and the control group was designated as 03.

The first ten questions were designed to solicit certain demographic information about each student. The remaining forty questions were directed to the lay-out and location of materials and areas of the library, or they were concerned with specific research tools, i.e., card catalog, Library of Congress Guide to Subject Headings, newspapers, periodicals, etc. Multiple choice questions were selected over true or false so that the guesswork was minimized.

Students in this study used the same answer sheet for the post-test as they did for the pre-test. Whereas during the pre-test they placed their answers on the front of the answer sheet (numbers 1 - 50), on the post-test each student used the back side of the same answer sheet, using numbers 101 - 150.

Questions 101 - 140 were exact duplicates of those

used on the pre-test requesting answers to questions posed about the facilities at Ward Edwards Library and specific research tools located there. The control group post-test had only these questions to answer.

At the onset the three groups were comparable in the scored mean averages after taking the pre-test. After each group concluded the post-test, the computer-assisted instruction group showed a significantly higher adjusted post-test mean, achieving a probability level of .0001. This far exceeded the alpha level of .05 that was originally set.

Teaching Method Evaluation

With regard to the students' evaluation of the general library tours vs. the CAI program, the last ten questions on the post-test of the CAI group and the tour group were devised to help assess individual opinions about the type of treatment (CAI or tour) to which they were exposed. Two of the ten statements (144 and 145) were answered with either a "yes" or a "no." Seven of the remaining statements were answered on a Likert-type scale of Strongly Agree, Agree, Disagree, or Strongly Disagree. The final statement (150) required an answer on a scale of 1 - 5 (Excellent to Poor).

Each statement/question, beginning with question number 141, is listed and the results for the two groups are given. Where it is deemed helpful for clarity, the data is also provided in an accompanying table.

Question 141: The time necessary for taking the computer program/library tour was too long.

The computer-assisted instruction group was more in agreement than the tour group with the statement that the teaching method was too long. In fact, a high majority (82.4%) of the CAI group claimed the program was too long, with 45.6% of that total in strong agreement. Three students (17.6%) disagreed with the statement. In the tour group, 45.3% of the students stated the tour was too long and only 9.4% were in strong agreement. Thirty-four students (53.1%) disagreed, and one student (1.6%) strongly disagreed.

Table 1

Time Necessary for Treatment Was Too Long

Group	Answer	Frequency	Percent	Cumulative Frequency	Cumulative Percent
CAI	Strongly Agree	31	45.6	31	45.6
	Agree	25	36.8	56	82.4
	Disagree	12	17.6	68	100.0
Tour	Strongly Agree	6	9.4	6	9.4
	Agree	23	35.9	29	45.3
	Disagree	34	53.1	63	98.4
	Strongly Disagree	1	1.6	64	100.0

Question 142: I feel the computer program/library tour helped me better understand the library and the materials located there.

The tour group was more in agreement with this statement

than was the CAI group. Fifty-nine (92.2%) of the sixty-four students agreed that the tour helped them, with fifteen (23.4%) of these in strong agreement. Fifty-seven (83.8%) of the sixty-eight students in the CAI group agreed with the statement, with twelve (17.6%) strongly agreeing. Three students (4.7%) in the tour group disagreed with the statement and two students (3.1%) strongly disagreed. Eight students (11.8%) in the CAI group disagreed with this statement and two students (2.9%) strongly disagreed with it. One CAI group student did not answer this part of the questionnaire. Refinements of these data are presented in Table 2.

Table 2

Group Attitude Toward Effectiveness of Treatment

Group	Answer	Frequency	Percent	Cumulative Frequency	Cumulative Percent
CAI	Strongly Agree	12	17.6	12	17.6
	Agree	45	66.2	57	83.8
	Disagree	8	11.8	65	95.6
	Strongly Disagree	2	2.9	67	98.5*
Tour	Strongly Agree	15	23.4	15	23.4
	Agree	44	68.8	59	92.2
	Disagree	3	4.7	62	96.9
	Strongly Disagree	2	3.1	64	100.0

*One student did not answer the question

Question 143: I feel the library computer program/tour guide effectively covered the material.

There was little disagreement between the two groups on this statement. One student from the tour group and two students from the CAI group did not answer this statement. Of the sixty-three students in the tour group who did answer it, eight (12.%) strongly agreed, forty-four (68.8%) agreed, ten (15.6%) disagreed, and one (1.6%) strongly disagreed. In the CAI group, ten (14.7%) strongly agreed, forty-nine (72.1%) agreed, five (7.4%) disagreed, and two students (2.9%) strongly disagreed. Table 3 presents a comparison of this data.

Table 3

Group Attitude About How Well Material Was Presented

Group	Answer	Frequency	Percent	Cumulative Frequency	Cumulative Percent
CAI	Strongly Agree	10	14.7	10	14.7
	Agree	49	72.1	59	86.8
	Disagree	5	7.4	64	94.2
	Strongly Disagree	2	2.9	66	97.1*
Tour	Strongly Agree	8	12.5	8	12.5
	Agree	44	68.8	52	81.3
	Disagree	10	15.6	62	96.9
	Strongly Disagree	1	1.6	63	98.5**

*Two students did not answer question.
**One Student did not answer question.

Question 144: Did you take notes during the computer program/library tour?

Three students, one in the CAI group and two in the tour group, did not answer this part of the questionnaire. The students in the CAI group indicated that they took notes on a more regular basis than did the tour group. Sixteen students (23.5%) in the CAI group said that they did take notes, while only two students (3.1%) in the tour group stated they took notes. Fifty-one students (75%) in the CAI group and sixty students (93.8%) in the tour group answered no to this question.

Question 145: Do you feel that you were allowed time to take notes during the computer program/library tour?

The students in the CAI program group were mostly in agreement with this question, while the tour group students were not. Sixty students (88.2%) in the CAI group and thirty-five students (54.7%) in the tour group answered yes to this question. The remaining eight students (11.8%) in the CAI program and twenty-nine students (45.3%) in the tour group felt that they were not given sufficient time to take notes.

Question 146: The statement for the CAI group was -- User interaction with the computer helped me to better understand the material that was presented.

Fifty-two (76.5%) students (8.8% strongly agreed and 67.6% agreed) were in agreement with this statement. Fourteen students (20.6%) disagreed and two students ((2.9%)

strongly disagreed. Two students did not respond to this statement.

The statement for the tour group was -- I feel I was encouraged to ask questions during the course of the library tour.

The responses of the tour group was very similar to those of the CAI group. Eight students (12.5%) strongly agreed, thirty-seven students (57.8%) agreed, sixteen students (25%) disagreed, and three students (4.7%) strongly disagreed with this statement.

Question 147: It would be more beneficial for students if the library used another method besides the computer program/library tour for library orientation/instruction.

Both groups responded very much the same way, with one student in the CAI group who did not respond to this statement. Seven students (10.3%) in the CAI group and six students (9.4%) in the tour group strongly agreed with the statement. Twenty-two students (32.4%) in the CAI group and twenty students (31.3%) in the tour group agreed. Thirty-eight students --thirty-three (48.5%) who disagreed and five (7.4%) who strongly disagreed --in the CAI group believed the CAI program to be a good method of instruction, while thirty-eight students --thirty-seven (57.8%) disagree and one (1.6%) strongly disagree -- thought the tour was a good method of instruction.

Question 148: I would recommend that other students take the computer program/library tour for orientation/instruction.

There seemed to be a small difference in the responses given by the two groups. Eleven students (16.2%) in the CAI group strongly agreed and thirty-nine students (57.4%) agreed with this statement. The remainder of this group -- fourteen (20.6%) who disagreed and three (4.4%) who strongly disagreed -- would not recommend that other students participate in the CAI program. One student did not respond.

In the tour group fifteen students (23.4%) strongly agreed and forty-three students (67.2%) agreed that they would recommend the tour to other students for library orientation/instruction. Only six students (9.4%) disagreed about recommending the tour as a method of library orientation/instruction.

Table 4

Students' Recommendation that Others Take Treatment

Group	Answer	Frequency	Percent	Cumulative Frequency	Cumulative Percent
CAI	Strongly Agree	11	16.2	11	16.2
	Agree	39	57.4	50	73.5
	Disagree	14	20.6	64	94.1
	Strongly Disagree	3	4.4	67	98.5*
Tour	Strongly Agree	15	23.4	15	23.4
	Agree	43	67.2	58	90.6
	Disagree	6	9.4	64	100.0

*One student did not answer this question

Question 149: The statement for the CAI group was - Not being able to visit the areas of library by using the computer program hindered me from remembering the location of library areas and the materials located there. The majority of the students -- nineteen (27.9%) strongly agreed and thirty (44.1%) agreed -- thought that by not physically visiting the areas of the library they were hindered in remembering more about the orientation. However, sixteen students (23.5%) disagreed that this hindered their orientation presentation. Three students did not respond to this statement.

The statement posed to the tour group was - Being able to visit the areas of the library on the library tour helped me to remember the location of the library areas and the materials located there. Two students (3.1%) strongly agreed, and forty-two students (65.6%) agreed that the tour helped them to remember the orientation part of the tour. Eighteen students (28.1%) disagreed and two students (3.1%) strongly disagreed that the tour helped them remember the location of the library areas and the materials located there.

Table 5 presents a comparison of how the two groups responded to this question.

Table 5

Group Attitude Toward Effectiveness of Treatment

Group	Answer	Frequency	Percent	Cumulative Frequency	Cumulative Percent
CAI	Strongly Agree	19	27.9	19	27.9
	Agree	30	44.1	49	72.0
	Disagree	16	23.5	65	95.5
	Strongly Disagree	0	0.0	0	95.5*
Tour	Strongly Agree	2	3.1	2	3.1
	Agree	42	65.6	44	68.8
	Disagree	18	28.1	62	96.9
	Strongly Disagree	2	3.1	64	100.0

*Three students did not answer the question

Question 150: All in all, I would rate the effectiveness of the computer program/library tour as

1 - 2 - 3 - 4 - 5
Excellent Average Poor

There was little difference in the percentages when looking at the number of responses that rated the effectiveness of the two teaching methods as average or above. Sixty students (88.2%) rated the computer program as average or above, and fifty-eight students (90.6%) rated the effectiveness of the tour as average or above.

Two students in the CAI group did not respond to this

statement. The large majority of those who did respond gave the computer program a rating above average -- three students (4.4%) rated it a 1, twenty-eight students (41.2%) rated it a 2. Twenty-nine students (42.6%) rated it as average. Six students rated it below average -- five students (7.4%) rated it a 4 and one student (1.5%) rated it a 5.

The student ratings in the tour were not much different, although more students rated it as a 1 or a 2 than did the CAI group. Four students (6.3%) rated it a 1 and twenty-two (34.4%) rated it a 2. Fifty percent of the students thought the effectiveness of the tour was average and six people rated it below average by giving it a 4. No student in the tour group rated the tour below a 4. Table 6 compares the responses between the two groups.

Table 6

Overall Attitude Concerning Treatment

Group	Answer	Frequency	Percent	Cumulative Frequency	Cumulative Percent
CAI	Excellent	3	4.4	3	4.4
	Above Ave.	28	41.2	31	45.6
	Average	29	42.6	60	88.2
	Below Ave.	5	7.4	65	95.6
	Poor	1	1.5	66	97.1*
Tour	Excellent	4	6.3	4	6.3
	Above Ave.	22	34.4	26	40.6
	Average	32	50.0	58	90.6
	Below Ave.	6	9.4	64	100.0

*Two students did not answer the question

As the above figures indicate, there was no stronger overall acceptance in ratings with regard to the amount of satisfaction or acceptance for the method of teaching by students who participated in either the CAI group or the tour group. Some statements/questions received a more favorable acceptance by one over the other, but the difference was not overwhelming. Therefore there was no rejection of the null hypothesis: There is no apparent difference in the attitudes and opinions about the method of instruction between the students taking the ENG 1020 tour and the students assigned to use the computer-assisted instruction program.

Summary

Responses to the ten questions on the post-test designed for collecting data for evaluating the students' opinions of the teaching method to which they were exposed were tabulated. Most students in both the CAI group and the tour group felt that their respective teaching method helped them to better understand the lay-out of the library and the basic research tools located there. The majority of students in each group also felt that the material was adequately covered in the CAI program or by the tour guide. There was also little disagreement among the two groups of students when asked if they would recommend that other students select the treatment to which they were exposed. Both groups would recommend the teaching method to other students.

When asked about their ability to take notes while experiencing the treatment, a high majority (88.2%) of the computer-assisted instruction group indicated they were allowed time to take notes, with sixteen (23.5%) stating that they did take notes. Only thirty-five students (54.7%) in the tour group felt they had time to take notes, with two students (3.1%) actually doing so.

Another area of disagreement between the two groups appeared when they were asked if the treatment had been too long. Even though the time for both treatments was virtually the same, less than fifty percent (45.3%) of the tour group felt the tour was too long, while over eighty percent (82.4) of the CAI group felt the treatment was too long. This does

not seem necessarily one-sided when one considers that the CAI group had to begin and end the treatment in one sitting with no time for a break. This factor could account for the consensus of the CAI group indicating that the CAI program was too long.

Finally, there was little difference in the over-all rating given the treatment method by either group. The majority in both groups indicated that they felt the teaching method in which they had participated was average or above. Since the CAI experimental group showed the highest adjusted post-test mean, and because the students' evaluation of the CAI program was equal (or better in some instances) to that of the general library tour, the CAI program proved to be more effective in teaching basic library orientation and research skills.

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